

Special Operations Forces To Test High-Speed Composite Vessel This Year

By Geoff Fein

Stiletto, an 80-foot long high-speed vessel made of composite materials, will not only get Special Operations Forces (SOF) to their missions quicker, but could increase crew safety and potentially create a new market for the shipbuilding industry, according to a Navy official with the Office of Force Transformation (OFT).

Stiletto will take to the water in August or September, a year from when the construction contract was signed. SOF will test the vessel at Wolf PAC, an exercise planned for the fall, off San Diego. Wolf PAC will explore command and control of geographically dispersed, networked, autonomous and semi-autonomous assets. The second exercise is planned for spring 2006, off Newport, R.I. Stiletto will participate in an antisubmarine warfare approach to warfare, said Cdr. Gregory Glaros, Office of Force Transformation.

In September 2004, OFT awarded San Diego-based M-Ship Company the contract to build a surrogate vessel that could operate at 50 knots, with a range of 500 nautical miles, deliver SOF to shore, sustain them while on their mission and provide them with intelligence information. Although there are a number of systems currently being tested to get SOF to their mission, Glaros said, the Navy has to look at a new vessel to provide SOF mobility, force insertion and sustainment.

"[Special Operation Forces] don't have the organic assets needed for them, dedicated for their purposes; that's what SOCOM is looking at," he said in an interview with Defense Daily. "That's why HSV is a healthy surrogate for that."

He added that the reason why programs like HSV, the Advanced Seal Delivery System and Stiletto are coming to fruition is that the Navy has a gap in its capability.

"If we talk about mobility, insertion and sustainment, you have to look at something fundamentally new," Glaros said.

Components on Stiletto, including weapons and sensors, are information technology-based

so that not only does the ship have access to information, but everybody off-board has access to information, too, Glaros added.

"So [Stiletto] becomes a global sensor without having to do any cosmetic changes or technical magic to make it happen," he said. "It's a fundamental shift in the packaging of vessels."

Stiletto will be outfitted with an electronic keel, or data bus, that will allow for easy weapon, sensor and mission reconfiguration that will reduce integration costs and increase combatant commanders use of assets, Glaros said.

Stiletto will use the Silver Fox and Manta unmanned aerial vehicles, both made by Arizona-based Advanced Ceramics Research, Glaros said.

Another aspect of Stiletto is its unique double M-hull configuration. It has four planning tunnels and two center-displaced hulls. The port and starboard skirts are independent of the hull and the centerline skirt is considered non-structural.

The design allows for the wave dissipation on each side of Stiletto. Wake energy goes up into the planning tunnels and air gets fed into these tunnels and creates dynamic lift, Glaros said. The dynamic lift causes the boat to ride on air and froth water, he added.

"It mitigates shock. On some tests we have run, its been one-third to one-half of a normal interceptor boat. That's tremendous," Glaros said.

And because it's using all the energy of the displaced wake, Stiletto has a very low wake signature on the back end, Glaros added. Mitigating that wake signature has "been quite beneficial," Glaros added.

The hull design should also add to crew safety by providing a more stable ride, Glaros said.

On any given operation, crews and sailors on the Mark 5 Special Operations Boat experience ejection seat-like shock twice an hour, Glaros said. Those crews are getting a high-impact of 10G shocks and often times

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when their seat fails they are getting 20G spikes, he said.

“The results show us that by 10 years, all of these personnel who operate these boats [will be] eligible for 100 percent disability. At any given time, 30 percent are med-down due to injuries sustained from [the pounding]. It’s the design of craft, it’s jolting and jarring.”

Dynamic lift combined with the composite materials used in building Stiletto, will lower the operating cost by decreasing fuel consumption, Glaros added. “We are going try to find out how much savings does it generate for the horsepower provided.”

The benefit of composite materials is that it decreases the structural weight significantly, Glaros said. “That’s less weight you have to carry around, less weight that engines have to push, so you can get smaller engines. It has a cascading effect.”

Using composite materials, such as carbon fiber, could also open up a new avenue for industry, Glaros said.

“It’s a fundamental different approach to the business of vessel construction. We want to showcase that, to show the positive path forward to do that,” he said. “Let’s create a new industrial base that can be competitive globally, in composite material science.”

OFT has a relationship with the Department of Transportation to look at dual use design and operations of crafts like Stiletto, he said.

Stiletto will be the first U.S. vessel in the 80-foot range to be built from composite materials. The Swedish Navy has been using composites for ships, such as on the Visby-class, and composites have become a mainstay in the aircraft industry.

The cost for composite materials for Stiletto is a little bit higher than traditional materials because this is the first time a U.S. shipbuilder will do anything like this on a big scale and because the only company that has done anything is Boeing [BA] with its 787, Glaros said. “We’d like to leverage what [Boeing is] doing.”

But until Stiletto takes to the water, no one really knows how well this new design will operate.

“We have no computational fluid dynamic (CFD) tools, models, that we can accurately ascertain the performance of these high perform craft, multi hulls and these frothing water interface,” Glaros explained. “We don’t have anything that can emulate that. It shocked me.”

The rule of thumb naval architects use is that if you build one vessel you can scale it at twice its size and it will behave in the same way, Glaros said. The test vessel for Stiletto is a 38-foot boat. Stiletto will be 80-feet in length with a beam of 40-feet.

“We don’t know if it will do [have the] characteristics as the [38-foot boat]. We think it will but we don’t know,” Glaros said.

One naval architect on the team is working with the Defense Advanced Research Projects Agency (DARPA), the Office of Naval Research (ONR) and University of South Hampton to hunt down the necessary CFD tools, “so we can do some judgments in the future and make designs, none of which exist today,” Glaros said. “That’s striking to me from an industrial base perspective.”

Stiletto will not undergo any tank testing, Glaros said. “We are paying \$6 million for this boat. We can build the boat, so the cost of testing in the tank is not worth it.”